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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/665,550	09/22/2003	Geoffrey Alan Scarsbrook	243042US0	6160
22850	7590	10/18/2005		
OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314			EXAMINER SONG, MATTHEW J	
			ART UNIT 1722	PAPER NUMBER
DATE MAILED: 10/18/2005				

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/665,550

Applicant(s)

SCARSBROOK ET AL.

Examiner

Matthew J. Song

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 19 September 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-41 is/are pending in the application.
- 4a) Of the above claim(s) 10-41 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948).              | Paper No(s)/Mail Date. _____  |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>1/6/05; 7/20/05</u> .   | 6) <input type="checkbox"/> Other: _____                                    |

## **DETAILED ACTION**

### ***Election/Restrictions***

1. Applicant's election with traverse of Group I, claims 1-9 in the reply filed on 9/19/2005 is acknowledged. The traversal is on the ground(s) that the Examiner has provided no reasons to support the assertion that a single crystal diamond having a surface substantially free of surface defects can be arrived at by the process of attempting to form a single crystal diamond heteroepitaxially on a single crystal substrate. This is not found persuasive because Claim 10 does not require a surface substantially free from defects, merely forming a diamond plate, which can be formed using heteroepitaxial growth.

The requirement is still deemed proper and is therefore made FINAL.

2. Claims 10-41 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in the reply filed on 9/19/2005.

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various

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claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1-7 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Scarsbrook et al (WO 01/96634 A1) in view of Saito et al (EP 0879904 A1).

In a method of producing a thick, single crystal diamond, note entire reference, Scarsbrook et al discloses providing a diamond substrate having a surface substantially free of surface defects, growing diamond homoepitaxially on the surface by chemical vapor deposition (CVD) with thickness greater than 3.0 mm (pg 7 and claim 3).

Scarsbrook et al does not teach severing the homoepitaxial CVD grown diamond and the substrate transverse to the surface of the substrate on which diamond growth took place to produce a plate of single crystal CVD diamond.

In a method of producing single crystalline diamond, note entire reference, Saito et al teaches a single crystalline diamond is vapor deposited on the major surface of a single crystalline diamond base material and thereafter cut out by cutting the base material along a plane substantially perpendicular to the major surface (col 3, ln 50 to col 4, ln 50 and col 9, ln 5-30), this reads on applicant's severed transverse to the surface of the substrate. Saito et al also teaches cutting out diamond in the form of a flat square (col 11, ln 45-50) and in the form of a rectangular parallelepiped (col 4, ln 5-20).

It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Scarsbrook et al by cutting the diamond perpendicular to the major surface, as taught by Saito et al, to remove twins and secondary nuclei abnormally growing during homoepitaxial growth (col 3, ln 50 to col 4, ln 5).

Referring to claim 2, the combination of Scarsbrook and Saito et al teach cutting the base material along a plane substantially perpendicular to the major surface, this reads on applicant's severed normal to the surface of the substrate.

Referring to claim 3-6, the combination of Scarsbrook and Saito et al teach a thickness greater than 3 mm ('040 Abstract and claim 3). Overlapping ranges are held to be obvious (MPEP 2144.05).

5. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Scarsbrook et al (WO 01/96634 A1) in view of Saito et al (EP 0879904 A1) as applied to claims 1-7 and 9 above, and further in view of Vichr et al (US 5,753,038) or Banholzer et al (US 5,360,479).

The combination of Scarsbrook and Saito et al teach all of the limitations of claim 8, as discussed previously, except the original substrate remaining in the single crystal CVD diamond plate is removed.

In a method of producing large single crystal diamond, note entire reference, Vichr et al teaches a single crystal diamond is formed on a single crystal diamond substrate (col 11, ln 50 to col 13, ln 15). Vichr et al also teaches after the termination of the crystal growth cycle, the newly grown diamond single crystal was then laser trimmed and separated from the diamond substrate. Vichr et al also teaches the original single crystal diamond seed plate was recovered after the

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separation process and reused again for another cycle of single crystal diamond fabrication (col 13, ln 1-15).

It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the combination of Scarsbrook and Saito et al by removing the original substrate, as taught by Vichr et al, to reuse the substrate in another deposition process.

In a method of forming single crystal epitaxial diamond, note entire reference, Banholzer et al teaches forming single crystal diamond using CVD onto a single crystal substrate and removing the thus formed single crystal diamond layer from the substrate (Abstract).

It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the combination of Scarsbrook and Saito et al by removing the original substrate, as taught by Banholzer, to reuse the substrate in another deposition process.

### ***Conclusion***

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew J. Song whose telephone number is 571-272-1468. The examiner can normally be reached on M-F 9:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Duane Smith can be reached on 571-272-1166. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MJS  
October 13, 2005

Matthew J Song  
Examiner  
Art Unit 1722



ROBERT KUNEMUND  
PRIMARY EXAMINER